Amendments to the Claims:

This listing of claims will replace all prior versions, all listings, of claims in the application:

Listing of Claims:

Claims 1-9 (Cancelled)

Claim 10 (Currently Amended): A proportional_to_Vt voltage amplifier, comprising:

a transconductance unit for generating a first current according to a first input voltage; and

a transresistance unit, coupled to a reference voltage, for generating a first output voltage according to the first current, wherein the difference between the first output voltage and the reference voltage is proportional to a thermal voltage;

wherein the transresistance unit comprises:

a first transistor for receiving the reference voltage;

a second transistor for generating the first output voltage;

a second current mirror coupled to the first transistor and the second transistor; and

a first bias current source coupled to the first transistor and the second transistor for providing a first bias current.

Claim 11 (Original): The proportional_to_Vt voltage amplifier of claim 10, wherein the transconductance unit comprises:

an operational amplifier having a first input end, a second input end, and an output end, wherein the first input end couples to the first input voltage; and

a first resistor having one end being coupled to the second input end and the output end of the operational amplifier, and the other end being coupled to ground;

wherein the first current flows through the first resistor.

Claim 12 (Original): The proportional_to_Vt voltage amplifier of claim 10 further comprising:

a first current mirror, coupled to the transconductance unit, for generating a second current according to the first current.

Claim 13 (Cancelled)

Claim 14 (Currently Amended): The proportional_to_Vt voltage amplifier of claim [[13]] 10, wherein the second current mirror comprises:

a third transistor having a first and a second ends coupled to the first transistor; and

a fourth transistor having a first end coupled to the second transistor and a second end coupled to the gate of the third transistor.

Claim 15 (Original): The proportional_to_Vt voltage amplifier of claim 10, wherein the proportional_to_Vt voltage amplifier is a half circuit of a differential proportional_to_Vt amplifier.

Claim 16 (Currently Amended): A proportional_to_Vt voltage amplifier, comprising:

a transconductance unit for generating a first current according to a first input voltage; and

a transresistance unit, coupled to a reference voltage, for generating a first output voltage according to the first current, wherein the difference between the first output voltage and the reference voltage is proportional to a thermal voltage;

~~wherein the transconductance unit comprises:~~

~~an operational amplifier having a first input end, a second input end, and an output end, wherein the first input end couples to the first input voltage; and~~

a first resistor having one end being coupled to the second input end and the output end of the operational amplifier, and the other end being coupled to ground;

~~wherein the first current flows through the first resistor~~

wherein the proportional_to_Vt voltage amplifier further comprises a first current mirror coupled between the transconductance unit and the transresistance unit for generating a second current according to the first current, and the transresistance unit comprises a second current mirror coupled to the transconductance unit through the first current mirror.

Claim 17 (Currently Amended): The proportional_to_Vt voltage amplifier of claim 16, ~~further comprising:~~

a first current mirror, coupled to the operational amplifier unit, for generating a second current according to the first current

wherein the transconductance unit comprises;

an operational amplifier having a first input end, a second input end, and an output end, wherein the first input end couples to the first input voltage; and

~~a first resistor having one end being coupled to the second input end and the output end of the operational amplifier, and the other end being coupled to ground;~~

wherein the first current flows through the first resistor.

Claim 18 (Currently Amended): The proportional_to_Vt voltage amplifier of claim [[17]] 16, wherein the transresistance unit comprises:

a first transistor for receiving the reference voltage;

a second transistor having a first end coupled to the first current mirror, wherein the second transistor is for generating the first output voltage;

~~a second~~ the second current mirror coupled to the first transistor and the second transistor; and

a first bias current source coupled to the first transistor and the second transistor for providing a first bias current.

Claim 19 (Previously Presented): The proportional_to_Vt voltage amplifier of claim 18, wherein the second current mirror comprises:

a third transistor having a first and a second ends coupled to the first transistor; and

a fourth transistor having a first end coupled to the second transistor and a second end coupled to the gate of the third transistor.

Claim 20 (Previously Presented): The proportional_to_Vt voltage amplifier of claim 16, wherein the proportional_to_Vt voltage amplifier is a half circuit of a differential proportional_to_Vt amplifier.

Claim 21 (Previously Presented): A proportional_to_Vt voltage amplifier, comprising:

a transconductance unit for generating a first current according to a first input voltage;

a transresistance unit, coupled to a reference voltage, for generating a first output voltage according to the first current, wherein the difference between the first output voltage and the reference voltage is proportional to a thermal voltage; and

a first current mirror, coupled to the transconductance unit, for generating a second current according to the first current;

wherein the transresistance unit further comprises:

a first transistor for receiving the reference voltage;

a second transistor having a first end coupled to the first current mirror, wherein the second transistor is for generating the first output voltage;

a second current mirror coupled to the first transistor and the second transistor; and

a first bias current source coupled to the first transistor and the second transistor for providing a first bias current.

Claim 22 (Previously Presented): The proportional_to_Vt voltage amplifier of claim 21, wherein the transconductance unit comprises:

an operational amplifier having a first input end, a second input end, and an output end, wherein the first input end couples to the first input voltage; and

a first resistor having one end being coupled to the second input end and the output end of the operational amplifier, and the other end being coupled to ground; wherein the first current flows through the first resistor.

Claim 23 (Previously Presented): The proportional_to_Vt voltage amplifier of claim 21, wherein the second current mirror comprises:

a third transistor having a first and second ends coupled to the first transistor; and

a fourth transistor having a first end coupled to the second transistor and a second end coupled to the gate of the third transistor.

Claim 24 (Previously Presented): The proportional_to_Vt voltage amplifier of claim 21, wherein the proportional_to_Vt voltage amplifier is a half circuit of a differential proportional_to_Vt amplifier.

Claim 25 (New): A variable gain amplifier, comprising:

a proportional_to_Vt voltage amplifier, comprising:

a transconductance unit for generating a first current according to a first input voltage; and

a transresistance unit, coupled to a reference voltage, for generating a first output voltage according to the first current, wherein the difference between the first output voltage and the reference voltage is proportional to a thermal voltage;

a gain controlling stage for generating a gain controlling voltage to control a voltage gain of the variable gain amplifier according to the first output voltage; and

an amplifying stage for providing the voltage gain of the variable gain amplifier

according to the gain controlling voltage;

wherein the voltage gain is independent of the thermal voltage.

Claim 26 (New): The variable gain amplifier of claim 25, wherein the voltage gain changes linearly in decibel in response to the gain controlling voltage.

Claim 27 (New): The variable gain amplifier of claim 25, wherein the transconductance unit comprises:

an operational amplifier having a first input end, a second input end, and an output end, wherein the first input end couples to the first input voltage; and

a first resistor having one end being coupled to the second input end and the output end of the operational amplifier, and the other end being coupled to ground;

wherein the first current flows through the first resistor.

Claim 28 (New): The variable gain amplifier of claim 25 further comprising a first current mirror coupled between the transconductance unit and the transresistance unit.

Claim 29 (New): The variable gain amplifier of claim 25, wherein the transresistance unit comprises:

a first transistor for receiving the reference voltage;

a second transistor for generating the first output voltage;

a second current mirror coupled to the first transistor and the second transistor; and

a first bias current source coupled to the first transistor and the second transistor for providing a first bias current.

Claim 30 (New): The variable gain amplifier of claim 25, wherein the amplifying stage couples to the gain controlling stage by using a current mirror structure.